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ABSTRACT

One crucial step toward an understanding of discrimination against blacks in rental housing is a careful analysis of the landlord's economic incentives. Such analysis does not exist in the literature. This paper develops a model of landlord behavior under perfect competition when both black and white tenants have racial prejudice. This model provides considerable support for open housing legislation and some insight into the design of such legislation. According to this exclusion model, open housing can help eliminate restrictions on the supply of housing available to blacks and reduce the differential between black and white rentals. Open housing will not lead to integration in individual apartment buildings, but this result is due to the prejudice of blacks and whites, not to any deficiency in the open housing approach to discrimination in housing. Furthermore, the exclusion model indicates that open housing will not be a financial disaster for landlords, and that it will not completely eliminate the black-white rent differential for neighborhoods undergoing racial change. Finally, clearinghouses for apartment information, which significantly lower landlords' incentives to discriminate, will increase the effectiveness of open housing legislation. Several ways to improve the effectiveness of open housing legislation are derived. (Author/JM)

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A MODEL OF DISCRIMINATION BY LANDLORDS

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ABSTRACT

This paper develops a model of landlord behavior under perfect competition when both black and white tenants have racial prejudice. The model predicts that landlords will often have an incentive to avoid renting to blacks, that apartment buildings will be completely segregated, and that there will be a positive black-white rent differential. It is also shown that effective open housing legislation will provide more housing for blacks, will not end segregation, will not be a financial disaster for landlords, and will not eliminate the black-white rent differential. Finally, several ways to improve the effectiveness of open housing legislation are derived.

A MODEL OF DISCRIMINATION BY LANDLORDS

One crucial step toward an understanding of discrimination against blacks in rental housing is a careful analysis of the landlord's economic incentives. Such an analysis does not exist in the literature; discussions of landlord incentives can be found, but they are incomplete at best and often inconsistent with the available evidence. In this paper, I will attempt to provide a more satisfactory model of landlord behavior.

The analysis that follows relies heavily on the distinctions among several terms. Prejudice is defined to be a strong, inflexible attitude toward a certain group of people. In contrast, discrimination is a type of behavior that denies one group of people rights or opportunities given to others.[1] Several different types of discrimination are of interest to economists.[2] In this paper we will focus on two types of discrimination in housing: price discrimination, which is the act of charging one group a higher price than another group for identical housing; and exclusion, which is any technique designed to avoid selling or renting housing in a given location to a certain group of people. Prejudice and discrimination should not be confused with two purely descriptive terms: segregation, which describes the physical separation of different groups of people, and price differential, which describes a difference in the prices paid by two groups for the same commodity. It should be emphasized that although all of the above terms are logically separate the phenomena to which they refer are closely related in the structure of American society.

The plan of the rest of this paper is as follows. Some basic assumptions about the apartment market and several empirical propositions about discrimination against blacks in that market are presented in section 1. A satisfactory theory of landlord behavior should begin with these assumptions and be consistent with these propositions. The implications of such a theory should then be subjected to empirical testing. In section 2, one hypothesis concerning landlord discrimination, that of Muth (1969), is evaluated and found to be inconsistent with much of the evidence about discrimination. An alternative theory is developed in sections 3 and 4, and the policy implications of that theory are discussed in the final section.

1. THE MARKET FOR APARTMENTS

Rental housing, which made up approximately 40 percent of the occupied housing in SMSAs in 1970, is supplied by an industry made up of many small firms.[3] In one of the few careful studies of rental housing, Sternlieb found that "less than a quarter" of the apartment buildings in the slums of Newark were owned by landlords possessing over six such buildings (1969, p. 122). Therefore, it is appropriate to begin, as have many theories about housing (such as Muth, 1960, and Olsen, 1969), with the basic assumption of perfect competition: no single landlord has a large enough share of the apartment market to be able to influence the price of his product.

The theory of the firm assumes that landlords will maximize their rental income subject to the rentals determined by competition. Although

this maximization problem is complicated by decisions about possible improvements on the apartments and about various tax provisions, rental income appears to be the primary concern of landlords. To cite Sternlieb again, interviews in the slums of Newark indicated that about 49 percent of the landlords were in the apartment business solely for the rental income and an additional 32 percent were in it partially for the rental income (1969, p. 156). Thus our second assumption is that landlords maxmize their rental income.

On the demand side of the apartment market, it is plausible to argue that racial prejudice affects the amount people are willing to pay for apartments in a given neighborhood and within a single apartment building. For example, a prejudiced white will live at an integrated location only if the price of housing is lower at that location than at all-white locations. Similarly, a prejudiced white will not be willing to pay as much to live in an integrated apartment building as to live in one with only white tenants. The study by King and Mieszkowski (1973) provides some evidence to support this view: they found that apartment rentals for whites in New Haven were 7 percent lower in the black-white boundary area than the rentals for identical apartments in the white "interior." There is no direct evidence about the effect of white prejudice on the price of housing within a single apartment building, but it seems reasonable to suppose that the effect is similar to the neighborhood-level effect.

The influence of black prejudice on housing prices is analogous to that of white prejudice; if blacks are prejudiced against whites, the price blacks are willing to pay for an apartment will decline with

proximity to whites. The results of the King and Mieszkowski study are consistent with this view. They found that apartment rentals for blacks were 2 percent lower near the black-white border than in the black interior; however, as I have pointed out elsewhere (Yinger, 1974, p. 189), there is an alternative interpretation of this result, so that it cannot be regarded as strong evidence that black rentals decline with nearness to whites.

Finally, there is evidence that landlords perceive the prejudice of their white customers and respond to it. (There is no evidence of a similar response to black prejudice.) The following two quotations illustrate this point. Denton (1967) cites the testimony of a representative of the National Apartment Owners Association who said:

> When one of the so-called minority groups moves in, the majority group moves out, and the end result will be financially calamitous to an owner who had no racial prejudice of his own. (p. 30)

And after an extensive study of rental housing in the Bay Area, Denton concludes that

> almost all [apartment owners] believe that their white tenants will leave if they rent any of their apartments to minority families. (cited in Foley, 1973, p. 98)

In summary, our theory of landlord behavior will be based on the following three assumptions:

(A1) The market for apartments is characterized by perfect competition in that no individual landlord can influence the price of his product.

(A2) Landlords attempt to maximize their income from the rental of apartments subject to competitive prices.

(A3) The demand from both blacks and whites for apartments in a given building is a decreasing function of the number of members of the other race who live in the building and its neighborhood.

There is also considerable evidence about segregation and discrimination in rental housing. The high degree of racial segregation in American cities is well-known and need not be documented here.[4] Although the racial characteristics of the tenants of individual apartment buildings have not been so extensively studied, the high degree of segregation that exists by block is consistent only with a high degree of segregation in the apartment buildings on each block. As further evidence, almost 72 percent of the apartment buildings in Sternlieb's study contained only black tenants, 17 percent contained only white tenants, and 7 percent contained both black and white tenants[5] (1969, p. 63).

Many researchers have discovered landlord discrimination against blacks. We will present some of the recent evidence for the two types of discrimination in housing defined earlier, exclusion and price discrimination.

Exclusion. A report by the National Committee Against Discrimination in Housing (NCDH) (1970) cites numerous examples of attempts by landlords in northeastern New Jersey to exclude blacks. Tactics include telling blacks that an apartment is already rented when it is not; refusing to accept deposits from blacks; sending blacks to a distant manager's office or refusing to accept their applications; applying more stringent acceptance criteria to black families; and carrying out more rigorous credit checks on blacks (1970, pp. 82-85).

The NCDH report also refers to the New York State Human Rights Commission's finding that the most common discriminatory techniques of landlords in New York were (1) misrepresenting the availability

of an apartment or the level of rent, (2) discrimination in procedure, (3) evasion or delay, and (4) discriminatory selection criteria (1970, p. 86).

Finally, considerable discrimination was uncovered in Denton's 1970 study of rental housing in the San Francisco area. Denton writes:

> Our conclusion from our research is that the vast majority [of apartment owners] discriminate. . . . Their usual tactics for avoiding integration are delay and red tape, i.e. the minority prospect gets delay and red tape and the white prospect gets the apartment. Where housing is as tight as it is in the Bay Area, discrimination becomes very difficult to prove and easy to practice. If a minority prospect can be held off for as little as four hours, it is usually time to get a bona fide white tenant signed up in time. . . .
>
> Time is bought in all kinds of ways by setting requirements almost no one can meet: by forms; by demanding references; by myriad uncertainties, even by failing to call back when an initial inquiry suggests that the prospect may be of a minority ethnic group. (cited in Foley, 1973, p. 98)

Price Discrimination. There is no direct evidence on the extent of price discrimination against blacks in rental housing, but there is considerable evidence about the black-white price differential. The most careful attempt to estimate this differential is the study by King and Mieszkowski (1969). They found that in the border area between the black and white interiors, blacks pay 7 percent more for their apartments than do whites. Furthermore, apartments rent for 9 percent more in the black interior than in the white interior.

It is not possible, however, to infer from a price differential that landlords practice price discrimination. As Downs (1961) and others have pointed out, a price differential can be caused by the exclusion of blacks from white neighborhoods. Some economists have

also argued that a price differential can be entirely due to tastes, but a review of the hypotheses about housing prices and race that have appeared in the economics literature reveals that each of these hypotheses is based, either explicitly or implicitly, on the assumption that there is price discrimination or on the assumption that blacks are excluded from white areas. (See Yinger, 1974, sec. II.2.) Tastes (and other factors) play a role in these theories, but they are not sufficient to cause a price differential. Consequently, in order to be consistent with the evidence, a theory of landlord behavior must predict price discrimination or exclusion or both.

The following three empirical propositions summarize our discussion of the evidence about discrimination in the apartment market:

(P1) Apartment buildings are, for the most part, completely segregated, that is, they have only white or only black tenants.

(P2) Attempts by landlords to exclude blacks from apartment buildings that contain white tenants are widespread.

(P3) Blacks pay a higher rental for an apartment with a given number of units of housing services than do whites; this is true when comparing apartments in the black-white border area or in the interior areas of the two groups.

2. MUTH'S CUSTOMER PREFERENCE HYPOTHESIS

The approach to landlord discrimination taken in this paper shares with the approach of Richard Muth an attempt to develop a theory of landlord behavior that is consistent with economic theory and with the main characteristics of the apartment market. Muth's discussion begins[6]

> It is commonly believed that residential segregation results from the refusal of landlords to rent to Negroes in white areas. . . .

> Indeed, so-called "open-occupancy" legislation would seem to be designed with this hypothesis in mind. While landlords. . . probably behave as alleged above, it is important to inquire into the reasons for their behavior. (1969, p. 106)

Muth then proceeds, in effect, to evaluate three hypotheses about residential segregation on the basis of two criteria. First, is it possible to "account for segregation in non-profit organizations or for the segregation of various other social and ethnic groups on the basis of such an hypothesis" (p. 107). Second, is the hypothesis consistent with profit maximization by landlords. Muth's first criterion is illogical. It does not make any sense to require a hypothesis about housing to account for nonresidential segregation: both the economic and the noneconomic incentives of individuals in the two cases are very different. Although Muth seems to place some importance on this criterion, I believe that it is irrelevant to an analysis of residential segregation.

Muth's second criterion is a slightly more general version of our assumption (A2); in addition to maximizing their rental income, landlords will sell their apartment buildings if it is profitable to do so. For example, Muth argues that prejudiced landlords will not be maximizing their profits if they rent to blacks since they could "sell out to others without an aversion to dealing with Negroes" who would "offer more than the capitalized value of the business to the landlords. . . who are averse to dealing with Negroes" (p. 107).

After rejecting two hypotheses--which he calls the "seller's preferency hypothesis" and the "collusion hypothesis"--because they do not meet this criteria, Muth presents what he considers to be a

"more reasonable explanation for residential segregation" (p. 107). This explanation, which he calls the "customer preference hypothesis"

> is that whites have a greater aversion to living among Negroes than do other Negroes. If so, whites would offer more for housing in predominantly white neighborhoods than would Negroes, and separation of the residential areas of the two groups would result. (p. 107)

Muth then applies this hypothesis to the behavior of landlords.

> The failure of landlords to rent to. . . Negroes is also readily understandable in terms of this explanation. The landlord's refusal may be interpreted as based on a desire to avoid the loss of white tenants. . . . Under these conditions, no other person would be willing to offer more for the landlord's building. . . and to deal with Negroes, since he would be subject to the same restrictions. (pp. 108-109)

In short, Muth argues that the prejudice of white renters gives landlords an incentive to exclude blacks. However, this argument is either fallacious or else it does not meet Muth's second criterion. If whites are willing to pay more to live in an apartment building in a white neighborhood, then in order to ensure an all-white building, the landlord simply has to set the rental at the level whites are willing to pay. Since no black will want to live in the building at that price, a profit-maximizing landlord will not have to discriminate. If, on the other hand, the landlord sets the price too low, not only will he have to exclude blacks in order to keep his white tenants, he will also not be maximizing profits.

Muth also discusses housing price differentials between blacks and whites, but he does not say anything about price discrimination by landlords. Since his assumptions always lead to completely segregated apartment buildings, no landlord will (except during transition periods) have the opportunity to charge blacks and whites different

rentals in a single building. Thus, the existence of neither price discrimination nor exclusion can be logically deduced from Muth's hypothesis, so that, for the reasons presented earlier, his hypothesis cannot explain why blacks pay more for their apartments.

In conclusion, Muth's customer preference hypothesis is based on the three assumptions about the apartment market listed in section 1. His hypothesis is consistent with the first empirical proposition about the racial characteristics of the apartment market, but it does not explain why landlords attempt, in many cases, to exclude blacks; indeed, the logic of his hypothesis indicates that they will not have an incentive to do so. Finally, since Muth's hypothesis also does not predict price discrimination, it cannot explain the differential in the rents paid by blacks and whites. Muth's hypothesis is a helpful beginning, but since it fails to explain either proposition (P2) or proposition (P3), it must be regarded as unsatisfactory.

3. A MODEL OF LANDLORD BEHAVIOR WITH EXCLUSION: THE CASE OF PREJUDICE

The model developed in this section, which we will refer to as the exclusion model, begins with the assumptions of perfect competition in the apartment market (A1) and the maximization of rental income by landlords (A2). In addition, we will assume that

(A4) All apartments in a given building are homogeneous (that is, they all have the same number of units of housing services).

(A5) Landlords can exclude as many blacks or whites from their buildings as they want to in order to maximize their rental income.

(A6) Tenants are not allowed to sublet their apartments.

The first of these assumptions is made to simplify the analysis; it has no significant impact on the results. Assumption (A5), which gives the model its name, indicates that landlords can successfully apply the techniques described in section 1 to keep either blacks or whites out of a building. Finally, landlords are assumed to forbid subletting in order to prevent tenants from influencing the racial composition or the level of rentals in an apartment building.

On the basis of these assumptions, we can say that the landlord's only choice-variable is the racial composition of his building. Now assuming that

(A7) Vacancies are never profitable[7],

it must be true in a building containing Q apartments that

(1) $Q_b + Q_w = Q$

where Q_b is the number of apartments rented to blacks and Q_w is the number rented to whites. Using equation (1), the landlord's problem can be simplified to the choice of the value of Q_b that maximizes his rental income.

On the demand side, we will begin with the assumption that both races are prejudiced, so that the amount customers are willing to pay for apartments in a given building declines as the number of tenants of the other race increases [assumption (A3)]. Other racial attitudes will be examined in section 4. The racial composition of the neighborhood around a building will affect the height of the demand curve for apartments in that building, but since a landlord must treat the neighborhood as given, neighborhood racial composition will not affect the slope of the demand curve.

Thus the demand function from whites for apartments in a given building is a decreasing function of the number of blacks in that building and can be written as follows:

$$(2) \quad P_w = D_w(Q_b) \quad , \quad D_w' < 0.$$

Equation (2) indicates that by picking a value of Q_b, a landlord determines the price he can charge his white tenants.

Similarly, we can derive a demand function for blacks:

$$(3) \quad P_b = D_b(Q_b) \quad , \quad D_b' > 0$$

which, as indicated, is an increasing function of Q_b.

One final assumption completes the model:

(A8) Landlords need not charge the same rental to blacks and whites, but can charge the amounts indicated by the black and white demand curves at whatever value of Q_b is chosen.

The landlord's problem is to pick the value of Q_b that maximizes his rental income subject to a capacity constraint and the demand functions (2) and (3). In symbols, the landlord will

$$(4) \quad \begin{aligned} &\text{Maximize} && R = P_b Q_b + P_w Q_w \\ &\text{Subject to} && P_b = D_b(Q_b) \\ & && P_w = D_w(Q_b) \\ & && Q_b + Q_w = Q \\ & && Q_b \geq 0 \\ & && Q_w \geq 0 \quad . \end{aligned}$$

Costs, such as maintenance, are fixed and can be ignored.

Substituting the first three conditions into the objective function, problem (4) becomes

$$\text{Maximize} \quad R = D_b(Q_b)Q_b + D_w(Q_b)(Q-Q_b)$$

(5)

$$\text{Subject to } Q - Q_b \geq 0$$

$$Q_b \geq 0 \quad .$$

The Lagrangian expression for this problem is

$$L = D_b(Q_b)Q_b + D_w(Q_b)(Q-Q_b) + \lambda(Q-Q_b)$$

and the Kuhn-Tucker first-order conditions are (dropping the argument Q_b, for simplicity)

$$(6.1) \quad \partial L/\partial Q_b = D_b'Q_b + D_b + D_w'(Q-Q_b) - D_w - \lambda \leq 0$$

$$(6.2) \quad Q_b(\partial L/\partial Q_b) = Q_b[D_b'Q_b + D_b + D_w(Q-Q_b) - D_w - \lambda] = 0$$

$$(6.3) \quad \partial L/\partial \lambda = Q - Q_b \geq 0$$

$$(6.4) \quad \lambda(\partial L/\partial \lambda) = \lambda(Q-Q_b) = 0 \quad .$$

The terms in the first condition require some interpretation. Since the total revenue from blacks is

$$TR_b = P_bQ_b = D_bQ_b \quad ,$$

we can easily derive the marginal revenue from blacks:

$$(7) \quad MR_b \equiv (d/dQ_b)TR_b = D_b'Q_b + D_b \quad .$$

Similarly, we know that

$$TR_w = P_wQ_w = D_wQ_w$$

so that

$$MR_w = (d/dQ_w)TR_w = Q_w(dD_w/dQ_b)(dQ_b/dQ_w) + D_w \quad .$$

But since $(dD_w/dQ_b) = D_w'$ and $(dQ_b/dQ_w) = -1$, we can rewrite this result as

$$(8) \quad MR_w = D_w - D_w'Q_w = D_w - D_w'(Q-Q_b) \quad .$$

It should be emphasized that both of these marginal revenues are functions of Q_b; MR_b is the marginal revenue obtained from blacks by increasing Q_b by one unit, and MR_w is the marginal revenue from whites by decreasing Q_b by one unit.

Now using equations (7) and (8) we can rewrite the first two conditions as

$$(6.1') \quad MR_b - MR_w - \lambda \leq 0$$

$$(6.2') \quad Q_b(MR_b - MR_w - \lambda) = 0 \ .$$

The four first-order conditions can be used to derive <u>necessary</u> conditions for three types of solutions to the landlord's problem: all-black, all-white, and integrated.

<u>Type 1</u>. All-black, or $Q_b = Q$ and $Q_w = 0$.

Since $Q_w = 0$, we know from (6.4) that $\lambda \geq 0$, and since $Q_b > 0$, we know from (6.2') that

$$MR_b - \lambda = MR_w \ .$$

Combining these two results, we find that (indicating the value of the argument, Q_b, for clarity)

$$MR_b(Q) \geq MR_w(Q) \ .$$

Furthermore, since $MR_w(Q) = D_w'(Q)(Q-Q_b) + D_w(Q) = D_w(Q)$,

we have

$$(9) \quad MR_b(Q) \geq MR_w(Q) = D_w(Q) \ .$$

In words, equation (9) indicates that a necessary condition for an all-black solution is that the marginal revenue from blacks when $Q_b = Q$ be greater than or equal to the marginal (=average) revenue from whites at $Q_w = 0$.

Type 2. All-white, or $Q_w = Q$ and $Q_b = 0$.

In this case, condition (6.4) indicates that $\lambda = 0$, so that by (6.1'),

(10) $MR_w(0) \geq MR_b(0) = D_b(0)$.

This result is, of course, the same as (9) with the races switched.

Type 3. Integrated, or $0 < Q_b < Q$.

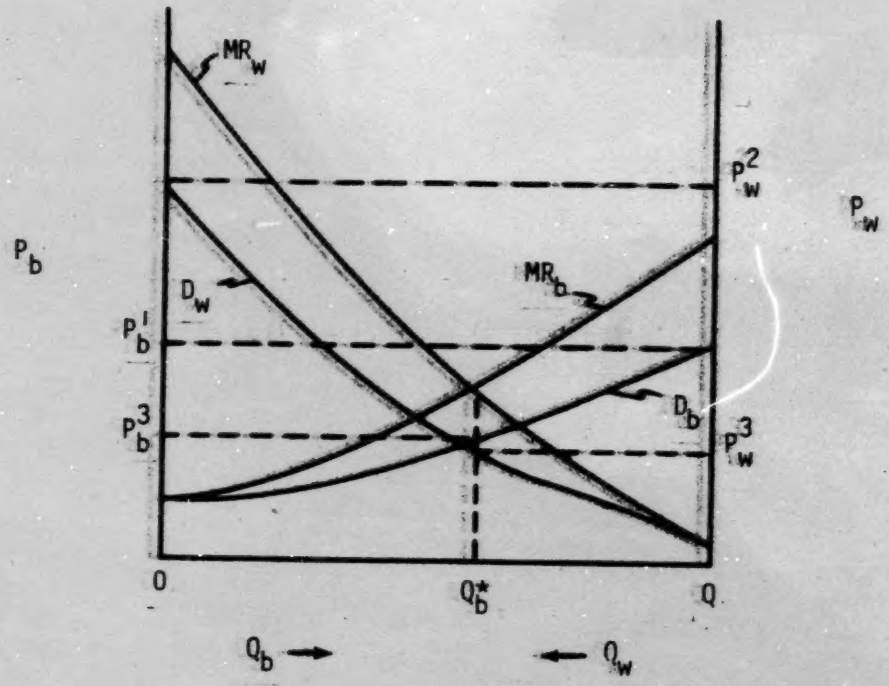
As with Type 2 solutions, condition (6.4) indicates that $\lambda = 0$; thus it is clear from (6.2') that

(11) $MR_b(Q_b) = MR_w(Q_b)$.

Hence, a necessary condition for an integrated solution is that there exist some Q_b greater than zero and less than Q for which the marginal revenues from the two races are equal.

Expressing this model in diagrammatic form will assist us in adding sufficient conditions for the three types of solution. Since the model contains only one choice-variable, Q_b, a simple diagram can be used: along the x-axis will be measured Q_b, so that Q_w $(=Q-Q_b)$ is simply the distance between Q_b and the constant point Q; the price paid by blacks will be measured on the y-axis; and the price paid by whites will be measured on a vertical line through Q. Given two demand functions--$P_b = D_b(Q_b)$ and $P_w = D_w(Q_b)$--we can derive the marginal revenue functions as shown above and plot the results on the diagram just described. An example of the graph of the exclusion model is given in Figure 1.

FIGURE 1



Diagrams like Figure 1 make it clear that the necessary conditions derived earlier are weak conditions. If the MR_b and MR_w curves intersect, as in Figure 1, all three necessary conditions are satisfied at some value of Q_b, and we still do not know what solution the landlord will pick; however, it is not difficult to find on a diagram the value of Q_b that maximizes the landlord's rental income. The key to the sufficient conditions is the measure of total income for each possible solution, or, referring to Figure 1:

Type 1: $R = P_b^1 Q$ = area under the P_b^1 line.

Type 2: $R = P_w^2 Q$ = area under the P_w^2 line.

Type 3: $R = P_b^3 Q_b^* + P_w^3 (Q - Q_b^*)$ = sume of the areas under the P_b^3 and P_w^3 lines.

An inspection of these three amounts reveals that the Type 2 solution yields the highest income. It is also clear that the integrated solution always results in a minimum income. To see this, note that MR_w is the marginal loss from whites, and MR_b is the marginal gain from blacks, from having one more black tenant. Thus, moving to the right from Q_b^* will increase revenue since MR_b is greater than MR_w. One can make use of the fact that MR_b is the marginal loss from blacks from having one more white tenant to show that leftward moves from Q_b^* are also profitable.

Thus the landlord's decision-making rule is very simple:

$$(12)\quad \begin{cases} \text{If } D_b(Q) = P_b(Q) > D_w(0) = P_w(0), \\ \quad \text{then set the price of an apartment at } D_b(Q) \\ \quad \text{in order to guarantee that } Q_b = Q; \\ \text{If } D_w(0) = P_w(0) > D_b(Q) = P_b(Q), \\ \quad \text{then set the price of an apartment at } D_w(0) \\ \quad \text{in order to guarantee that } Q_b = 0. \end{cases}$$

In short, an income-maximizing landlord will want tenants solely from the group with the highest demand for apartments in a building that is entirely of its own race.

It is important to note here that so far a landlord's behavior does not involve any discrimination. Simply by setting the price of an apartment at the greater of $D_b(Q)$ and $D_w(0)$, the landlord can be certain that members of the group he does not want will be unwilling to pay for his apartments. Since only one group wants to live in his building, the landlord does not have an opportunity to practice either exclusion or price discrimination. However, when placed in the context of an urban area, the exclusion model reveals that landlords will have an incentive to discriminate against blacks.

Outside of the South, few areas in American cities were orginally inhabited by blacks. Using the terms of the exclusion model, apartment buildings were originally filled with whites because black demand was virtually nonexistent. As the black population and black incomes grew, the black demand for housing increased until in many neighborhoods the black demand curve at $Q_b = Q$ was higher than the white demand curve at $Q_w = Q$. At this point the exclusion model indicates

that a landlord will have an incentive to raise the price of an apartment to $D_b(Q)$. As a result, whites will no longer want to live in that building and the white tenants will be gradually replaced by black tenants--who are willing to pay the higher price.

However, the transition from white to black tenants is not, as we have so far implied, costless; in fact, the transition costs may be substantial. There are three sources of these transition costs:

1. The exclusion model implies that unless rentals are protected by leases, average rentals will decline during the transition period since neither blacks nor whites are willing to pay as much for an apartment in an integrated building.

2. In order to find a new tenant, a landlord must advertise the apartment, interview applicants, check the applicants' credit references, and carry out needed maintenance of the apartment.

3. If a landlord has an aversion to dealing with blacks, he must be compensated for doing so by receiving a higher rental from blacks. Muth argues that a prejudiced landlord will maximize his profits by selling out ot a landlord who does not have an aversion to dealing with blacks. But if landlords who are not prejudiced against blacks are themselves black, the original landlord will have to be compensated before he will make the sale. Furthermore, many landlords, including almost 37 percent of the landlords in Sternlieb's sample (1969, p. 134), live in their apartment buildings and would also have to be compensated for their moving expenses.

Thus the transition from white to black tenants may involve substantial monetary and psychic costs for a landlord. Unless the price blacks are willing to pay for an all-black building exceeds

the price whites are willing to pay for an all-white building by more than the per-tenant transition cost, the landlord will want to retain his white tenants.

Two cases need to be distinguished:

Case 1: $D_b(Q) < D_w(0) + t$

$D_b(0) < D_w(0)$

Case 2: $D_b(Q) < D_w(0) + t$

$D_b(0) > D_w(0)$

where t is the per-tenant transition cost. These two cases are illustrated, respectively, in Figures 2 and 3. In Case 1, the landlord does not have any incentive to practice exclusion; he simply sets the price of an apartment at $D_w(0)$ and is certain that no blacks will want to live in his building at that price.

In Case 2, however, the landlord still does not want to make the transition from white to black tenants, but if he sets the price at $D_w(0)$, some blacks will want apartments in his building. Therefore, the landlord will have an incentive to exclude blacks from his building.

It is clear that when the black demand curve rises to the point where $D_b(0)$ equals $D_w(0)$, Case 2 will obtain only if

(13) $D_b(Q) - D_b(0) < t$,

that is, only if the amount blacks are willing to pay for "blackness" in an apartment building is less than the per-tenant cost of transition from white to black.

Unfortunately, there is not enough evidence to know whether or not condition (13) is met in many neighborhoods. For three reasons,

FIGURE 2.

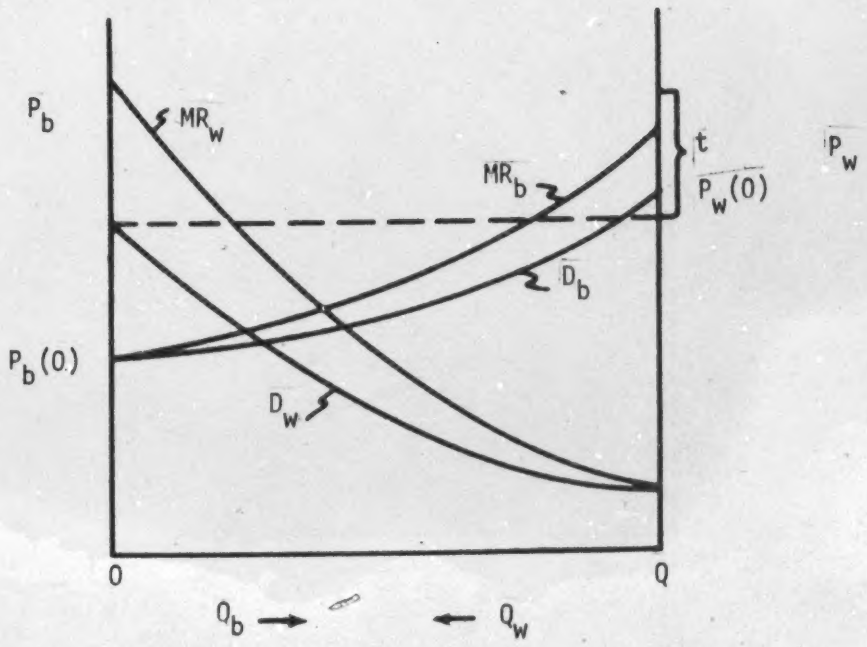
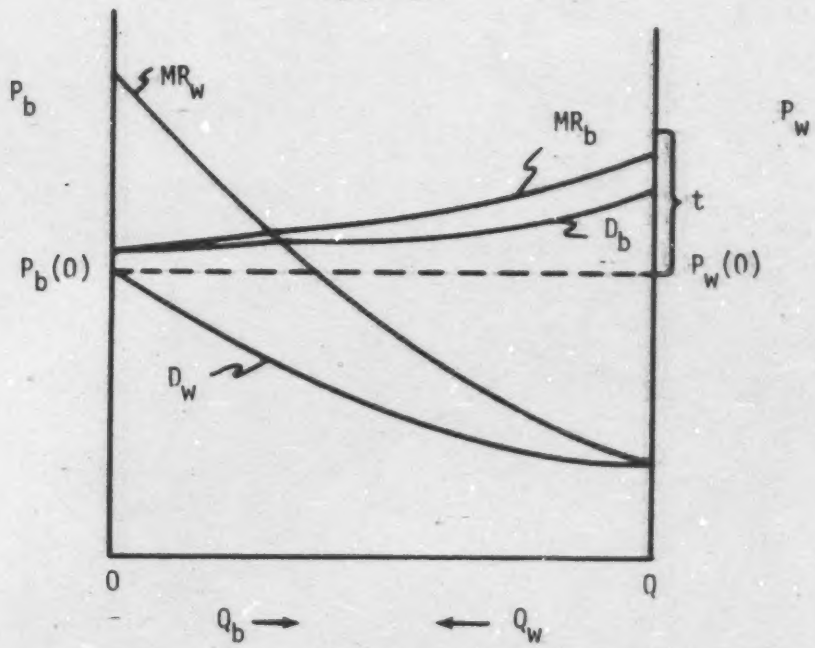


FIGURE 3.



however, it appears to be a weak condition. First, transition costs are probably substantial. Second, the work of King and Mieszkowski (1973) suggests that blacks are willing to pay only about 2 percent more for a black neighborhood. Only if there is substantial price discrimination in integrated neighborhoods but not in black neighborhoods--a possibility for which there is no evidence--can this result be an underestimate of the effect of black prejudice on apartment rentals. Blacks may have stronger feelings about their fellow tenants than about the neighbors across the street, but at this point the King-Mieszkowski result is the only evidence available.

Third, recent surveys indicate that many urban blacks prefer integrated neighborhoods.[8] If such attitudes carry over to individual apartment buildings, then the black demand curve in the exclusion model will be upward sloping for small values of Q_b and downward sloping for large values of Q_b. In this case all of the analysis presented above is still valid,[9] but the difference between $D_b(Q)$ and $D_b(0)$ will be smaller than with completely upward-sloping black demand curves. Needless to say, more information is required on the slope of the intra-apartment-building demand curves for blacks.

In summary, the prejudices of blacks and whites guarantee that complete segregation will exist as long as there is a substantial difference between the black and white demand for housing in any particular neighborhood. The landlord fosters segregation by using the following decision-making rule:

(14)
$$\begin{cases} \text{If } D_b(Q) < D_w(0) + t \text{ and } D_b(0) < D_w(0), \\ \quad \text{then set the price at } D_w(0) \text{ in order to} \\ \quad \text{have an all-white building;} \\ \text{If } D_b(Q) < D_w(0) + t \text{ and } D_b(0) > D_w(0), \\ \quad \text{then set the price at } D_w(0) \text{ and exclude all} \\ \quad \text{blacks in order to have an all-white building;} \\ \text{If } D_b(Q) > D_w(0) + t, \\ \quad \text{then set the price at } D_b(Q) \text{ in order to} \\ \quad \text{have an all-black building.} \end{cases}$$

The second part of this rule indicates that in changing neighborhoods where black demand and white demand are similar, landlords will have an incentive to exclude blacks until black demand is very high whenever the price blacks will pay for blackness is less than the per-tenant cost of transition from white to black.

Note that the exclusion model predicts that blacks will pay higher prices in changing neighborhoods because landlords will only make the switch from white to black tenants if their transfer costs are covered by the higher prices paid by blacks. In other words, because of the exclusion of blacks by landlords, blacks pay more for their apartments than do whites. Thus, the exclusion model provides an explanation for proposition (P3). Note further that when the black demand curves shift above the white curves in changing neighborhoods, they will also shift upward in areas that are all black; therefore, exclusion by landlords in changing neighborhoods will lead to a positive price differential between rentals in black neighborhoods

and rentals in white neighborhoods (in addition to any differential caused by a declining price-distance function for housing and the central location of blacks).

4. A MODEL OF LANDLORD BEHAVIOR WITH EXCLUSION: REVERSE PREJUDICE AND IMPERFECT COMPETITION

The exclusion model developed in section 3 can also be used to shed some light on two other cases: reverse prejudice and imperfect competition. Each of these two phenomena will be treated in turn.

If one group exhibits reverse prejudice--if its members prefer to live with members of the other race--then the slope of the demand curve for that group will have the opposite sign from that assumed in section 3. For example, if blacks have reverse prejudice, their demand function is

$$(15) \quad P_b = D_b(Q_b) \quad , \quad D_b' < 0 \quad .$$

Looking more carefully at the case in which blacks have reverse prejudice and whites have prejudice, we find that if the black demand curve is less steep than the white demand curve, then, as before, only segregated solutions are possible. However, as illustrated in Figure 4, landlords will have an incentive to exclude blacks, even without transition costs, when the black demand curve shifts above the white curve. Since $D_b(0)$ is greater than $D_b(Q)$, condition (13) is always met and landlords will practice exclusion until it is profitable to make the transition to an all-black building.

If the black demand curve is steeper than the white demand curve, integrated solutions are possible. In particular, if the MR_b and MR_w

FIGURE 4.

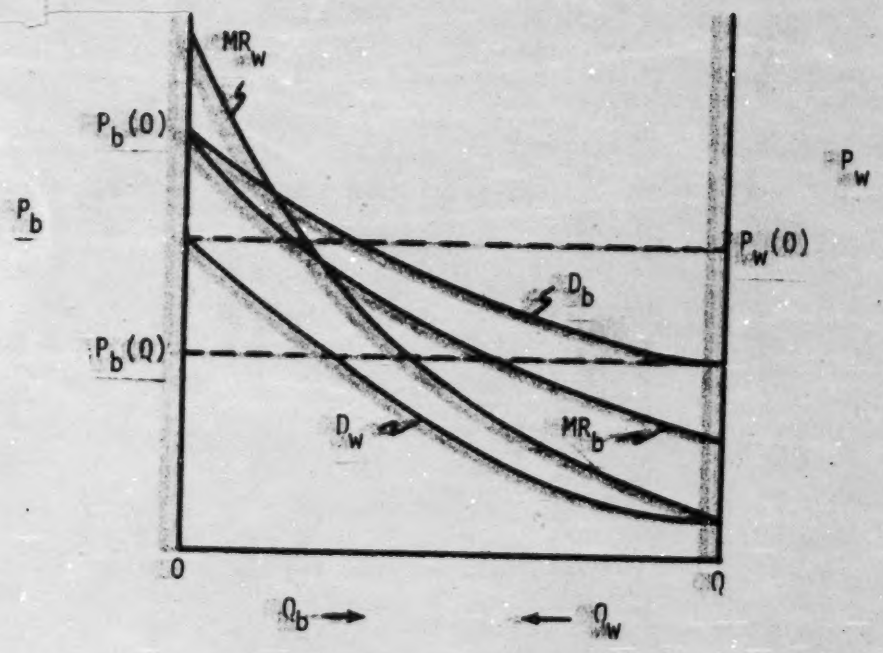
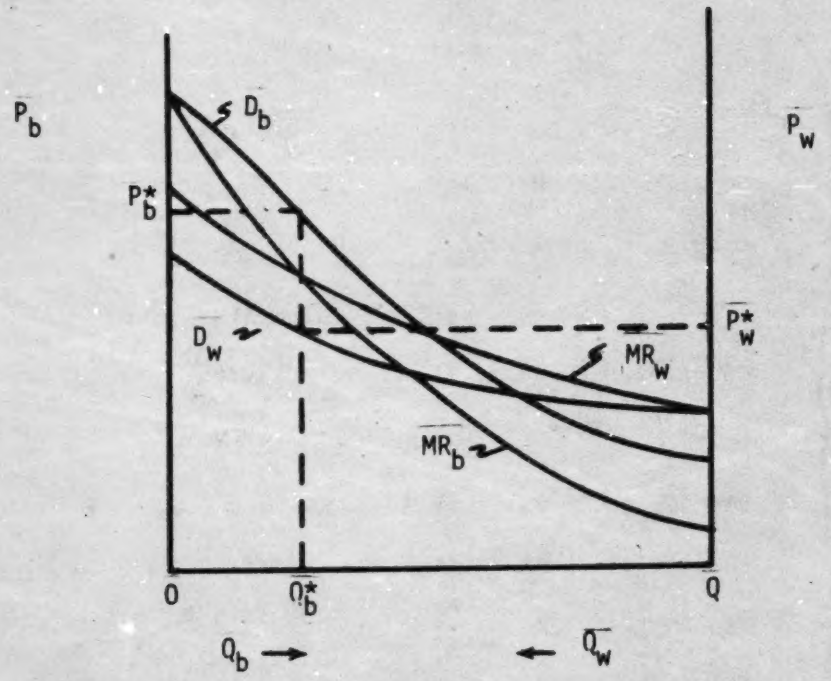


FIGURE 5.



curves intersect at Q_b^*, then the marginal loss exceeds the gain for a move in either direction from Q_b^*; thus, Q_b^* is the quantity that maximizes revenue. Furthermore, at Q_b^* the price landlords charge blacks will be above the price they charge whites--that is, landlords will practice price discrimination against blacks. An example of this case is given in Figure 5.

In summary, if blacks have reverse prejudice, then the landlord's decision-making rule is:

(16)
- If $D_b(Q) < D_w(0) + t$ and $D_b(0) < D_w(0)$, then set the price at $D_w(0)$ in order to have an all-white building;
- If $D_b(Q) < D_w(0) + t$, $D_b(0) > D_w(0)$, and $D_b(Q) > D_w(Q)$, then set the price at $D_w(0)$ and exclude all blacks in order to have an all-white building;
- If $D_b(Q) < D_w(0) + t$, $D_b(0) > D_w(0)$, and $D_b(Q) < D_w(Q)$, then pick the value of Q_b at which the MR curves intersect and practice price discrimination against blacks;
- If $D_b(Q) > D_w(0) + t$, then set the price at $D_b(Q)$ in order to have an all-black building.

If both groups exhibit reverse prejudice, the necessary conditions derived in section 3 are (ignoring transition costs) also sufficient conditions. Thus, landlords will choose to have integrated buildings whenever the MR curves cross. Integrated solutions can now involve

price discrimination against either blacks or whites. Since the condition for an integrated solution is

$$MR_b = D_b + D_b'Q_b = MR_w = D_w - D_w'Q_w \quad ,$$

it is clear that in order for D_b to be greater than D_w it must be true that

$$D_b - D_w = -Q_b D_b' - Q_w D_w' > 0$$

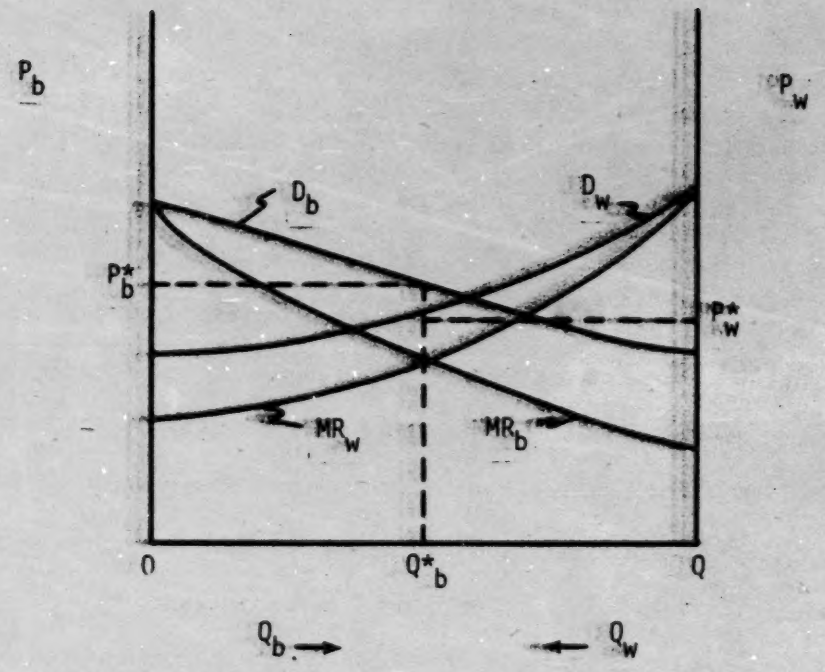
or

$$(17) \quad -D_b'/D_w' > Q_w/Q_b \quad .$$

Thus the probability of price discrimination against blacks increases with both the steepness and the height of the black demand curve. Figure 6 illustrates demand curves that satisfy condition (17).

Finally, there is the case of imperfect competition. If a single landlord has market power, then the price he can charge to either group depends negatively on the number of members of that group in his building, as well as on the racial composition of his building. Imperfect competition in the market for apartments for blacks means that the demand from blacks for apartments in a given building will be a downward-sloping function of the number of blacks in the building. Hence, imperfect competition affects the exclusion model in the same manner as reverse prejudice. If, for example, there is enough imperfect competition in the black apartment market, the black demand curve may be downward sloping in spite of black prejudice. Consequently, it is possible for the results derived in this section to obtain in the case of prejudice if there is enough imperfect competition to dominate the effect of prejudice.

FIGURE 6.



Note that even if imperfect competition does not dominate the effect of black prejudice, it will flatten the black demand curve and make it more likely that condition (13) be met; the more imperfect competition there is in the market for apartments for blacks, the more likely it is that landlords will have an incentive to exclude blacks.

All of the results we have derived from the exclusion model are summarized in Table 1. This table collects the decision-making rules (14) and (16) and adds the rules for the case in which both groups have reverse prejudice. The rentals for blacks and whites are not indicated in this table, but they can be determined from the demand functions at the value of Q_b chosen by the landlord.

5. OPEN HOUSING AND THE EXCLUSION MODEL

"Open housing" is the general term we will use for any legislation that effectively prevents exclusion or price discrimination against blacks. In this section we will examine the effects of open housing on the exclusion model. It is hoped that this procedure will give us some insight into the design of open housing legislation.

Muth describes the policy implications of his hypothesis as follows:

> If the customer preference hypothesis is correct, then enforced open-occupancy legislation would have little effect on the residential segregation of Negroes. Such legislation might force some landlords who otherwise would not rent to Negroes to do so. But, if their white tenants have an aversion to living among Negroes and comparable housing is available to them elsehwere at the same price, they will tend to move out of the integrated buildings and neighborhoods, and the area will come to be inhabited wholly by Negroes. The enforced open-occupancy legislation would tend primarily to penalize landlords. . . for catering to the preferences

TABLE 1

A Summary of the Exclusion Model

Description of the Black and White Demand Curves		Racial Composition of an Apartment Building	Type of Discrimination by Landlords Against Blacks
1. Both Groups Prejudiced, i.e., $D_b'> 0$ $D_w' < 0$	A. $D_b(Q) < D_w(0) + t$ $D_b(0) < D_w(0)$	all white	none
	B. $D_b(Q) < D_w(0)$ $D_b(0) > D_w(0)$	all white	exclusion
	C. $D_b(Q) > D_w(0) + t$	all black	none
2. Blacks Have Reverse Prejudice or Black Prejudice Dominated by Imperfect Competition, i.e., $D_b' < 0$ $D_w' < 0$	A. $D_b(Q) < D_w(0) + t$ $D_b(0) < D_w(0)$	all white	none
	B. $D_b(Q) < D_w(0) + t$ $D_b(0) > D_w(0)$ $D_b(Q) > D_w(Q)$	all white	exclusion
	C. $D_b(Q) < D_w(0) + t$ $D_b(0) > D_w(0)$ $D_b(Q) < D_w(Q)$	integrated	price discrimination
	D. $D_b(Q) > D_w(0) + t$	all black	none
3. Both Groups Have Reverse Prejudice or Prejudice Dominated by Imperfect Competition, i.e., $D_b' < 0$ $D_w' > 0$	A. $D_b(0) < MR_w(0) + t$	all white	none
	B. MR curves intersect $-D_b'/D_w' > Q_w/Q_b$	integrated	price discrimination
	C. MR curves intersect $-D_b'/D_w' < Q_w/Q_b$	integrated	price discrimination against whites
	D. $MR_b(Q) > D_w(Q) + t$	all black	none

> of their customers. Such legislation, however, might tend to make the area inhabited by Negroes grow more rapidly over time by making it easier for them to obtain housing outside existing Negro areas. (1969, p. 109)

It seems to me that the above quotation contains three main conclusions about open housing legislation:

(M1) It will not eliminate segregation.

(M2) It will make the area inhabited by blacks grow more rapidly.

(M3) It will "tend primarily to penalize landlords."

The exclusion model leads us to agree with the first two of these conclusions; however, it also indicates that Muth's third conclusion will obtain only in one special case, and it adds a fourth conclusion about the black-white rent differential.

In examining the effects of open housing on the exclusion model, we will refer to the cases listed in Table 1. In six of the eleven cases (1A, 1C, 2A, 2D, 3A, and 3D), open housing will have no effect since landlords do not practice any discrimination.

Of the cases that involve discrimination, case 1B is the only one based on the two plausible assumptions of black prejudice and perfect competition; it will therefore be examined in some detail.[10] By eliminating exclusion in case 1B, open housing enables blacks to outbid whites for apartments in previously all-white apartment buildings. Since blacks will outbid whites at every value of Q_b, racial transition in this case will end when all the white tenants are replaced by black tenants. At this new solution the price of an apartment will be $D_b(Q)$. Thus, we can conclude that in case 1B the results of open housing will be

(E1) Complete turnover from white to black tenants and hence the continuation of complete segregation;

(E2) An increase in the supply of housing available to blacks;

(E3) The payment of the difference between $D_w(0) + t$ and $D_b(Q)$ by landlords;

(E4) A decrease in (but not elimination of) the differential between black and white rentals.

The first two conclusions are identical, respectively, to (M1) and (M2). Conclusion (E1) expresses the not-very-surprising result that open housing will not make the two races want to live together, whereas (E2) indicates that open housing is likely to achieve its main objective, namely the elimination of restrictions on the supply of housing for blacks.

Conclusion (E3) differs from Muth's third conclusion in that it specifies the extent of the landlord's losses. As stated in section 3, the cost of racial transition represents (1) lower average rentals during transition, (2) the payment of turnover costs by landlords, and (3) the landlord's aversion to dealing with blacks. Open housing would require the landlord to pay the portion of these costs that was not covered by the higher rentals charged to blacks.

It is difficult to reconcile conclusion (E3) with the common belief that open housing would be "financially calamitous to an owner who had no racial prejudice of his own." (See page 4.) Turnover costs may be significant at the margin, but they are only a small fraction of a landlord's income, and they are offset to some degree by the higher rentals received from black tenants. Furthermore, (E3) is not in accord with Muth's conclusion that open housing "would tend

primarily to penalize landlords. . . for catering to the preferences of their customers." Open housing will tend primarily to do what it is designed to do--help blacks obtain housing--with some losses in the process for landlords. Muth's use of the term "catering" in this context is misleading because it implies that landlords are motivated primarily by a desire to please their customers instead of by a desire to maximize profits. The turnover costs that must be paid by landlords should be recognized, but they should not be exaggerated.

The fourth conclusion about open housing is that it will decrease, but not eliminate, the black-white rent differential. To show this, let us take two identical apartment buildings located in the same neighborhood. Now assume that the black and white demand curves for each building intersect at the same price when Q_b equals zero ($D_b(0) = D_w(0) = P^*$ for each building). These two buildings are at the margin of racial transition: an infinitesimal increase in the black demand curve would lead to an all-black building. Now if one building changes to black tenants, the price paid by blacks in that building will be $D_b(Q)$, which, because of the slope of the black demand curve, is greater than $D_b(0)$ $[=D_w(0)]$; therefore, a black will pay more than a white for an identical apartment. In short, unless blacks are not prejudiced (so that the black demand curve is flat), the historical direction of racial transition (from white to black) insures that blacks will pay more for their apartments than will whites.

The black-white price differential will disappear in the long run only if both blacks and whites are able to bid for apartments in new buildings. In that case the exclusion model implies that buildings will still be completely segregated (with the race of the occupants determined by the race of the first tenant), but the rentals of blacks and whites will be the same. Therefore, in order for blacks and whites to obtain housing on the same terms, it is important for open housing legislation to encompass new rental housing and renovated apartment buildings that become available in changing neighborhoods.

Further insight into the design of open housing legislation can be gained by focusing on one important implication of the exclusion model, namely that information costs are a primary cause of discrimination in housing. To be specific, we have shown that transition costs, a large portion of which are the information costs involved in finding new tenants, give landlords a strong economic incentive to exclude blacks. Thus, the exclusion model describes a situation in which imperfect information leads to a noncompetitive result--discrimination.[11] In this context, open housing legislation can be interpreted as an attempt to obtain a competitive solution, that is, to eliminate discrimination.

In order to be effective, open housing legislation must alter the incentives that lead landlords to discriminate. In the past, such legislation has attempted to make discrimination unattractive to landlords by placing legal sanctions on discriminatory behavior. Although this approach has been successful in a few localities, it has proved to be impractical on a large scale; the interest groups that oppose

open housing are usually strong enough to limit the severity of the legal sanctions or to prevent the effective enforcement of those sanctions. (See Foley, 1973, pp. 126-129.)

An alternative approach to open housing legislation, which can be derived from the exclusion model, is to lower landlord incentives to discriminate by lowering the costs associated with racial transition. This alternative could be implemented by establishing government clearinghouses for apartment information. Such clearinghouses would assist in the matching of tenants with apartments; consequently, landlords would have lower search costs, and since new tenants would be found more quickly, landlords would have smaller losses from the lower rentals during racial transition. In sum, the exclusion model implies that clearinghouses could signficantly lower landlords' incentives to discriminate, without the massive commitment of government resources required to enforce legal sanctions. To the extent that transition costs are not simply information costs, however, effective open housing legislation would have to provide for legal sanctions as well as for clearinghouses.

Another important advantage of clearinghouses is that they would lessen landlords' ability to discriminate, since the information given to blacks by landlords about the availability and price of apartments could be checked against the information posted in the clearinghouses.[12] Needless to say, clearinghouses would only serve this function if landlords were required to post information about all available apartments.

Now let us turn to the special cases of the exclusion model. The following cases are based on implausible assumptions about the slopes

of the black and white demand curves within an apartment building, but they cannot be ruled out without more evidence about these slopes.

To begin with, the exclusion model reveals that it is theoretically possible for open housing to be financially disastrous for landlords. In case 2B (see Figure 4), open housing still costs the landlord the difference between $D_w(0) + t$ and $D_b(Q)$, but $D_b(Q)$ is now below $D_w(0)$, so that the cost may be substantial. Therefore, if blacks have reverse prejudice (or if there is considerable imperfect competition in the black apartment market), effective open housing legislation will require some combination of severe legal sanctions and extensive compensation of landlords in changing neighborhoods.

To complete the analysis of case 2B, note that conclusions (E1) and (E2) still hold. In addition, the price differential will actually be reversed in changing neighborhoods since at the margin of racial transition whites will pay more than blacks.

Two cases involve price discrimination against blacks: 2C and 3B (represented, respectively, in Figures 5 and 6). Although this price discrimination is not the result of the market power of the seller, the effects of open housing in these two cases are the same as the effects of elimination of price discrimination in any market: the profits of the discriminator decline and the price differential is eliminated. The landlord now picks the value of Q_b at which the two demand curves cross, or, if they do not cross, he sets Q_b equal to Q and charges his all-black tenantry a rental equal to $D_b(Q)$. Thus we can draw the following conclusions about what will happen if price discrimination is eliminated:

(P1) The number of white tenants will decline (to zero if the demand curves do not cross);

(P2) The supply of housing to blacks will increase;

(P3) The discriminating landlord will lose the profits attributable to price discrimination;

(P4) The rent differential in border areas will be exactly eliminated.

Case 3C is the same as 3B with the races switched.

In summary, we can conclude that in every case except 3C, open housing

1. will not lead to integration;
2. will increase the supply of housing available to blacks;
3. will hurt landlords financially to some degree; and
4. will reduce the differential between black and white rentals.

The differences among the cases are primarily ones of degree. Relative to the standard case, 1B, the position of blacks (the supply of housing available to them and their rental relative to the white rental) is improved and the position of landlords worsened as one moves through cases 3B, 2C, and 2B. The following specific results can also be derived from the exclusion model:

5. in case 1B open housing will not eliminate the rent differential in border areas;
6. only in case 2B is there justification for the claim that open housing is a financial disaster for landlords;
7. in case 2B open housing will reverse the rent differential in border areas;
8. in cases 2C and 3B open housing may lead to segregation in buildings where there has been integration; and

9. only in cases 2C and 3B will open housing exactly eliminate the black-white rent differential in border areas.

In conclusion, the exclusion model provides considerable support for open housing legislation and some insight into the design of such legislation. According to the exclusion model, open housing can help eliminate restrictions on the supply of housing available to blacks and reduce the differential between black and white rentals. Open housing will not lead to integration in individual apartment buildings, but this result is due to the prejudices of blacks and whites, not to any deficiency in the open housing approach to discrimination in housing. Furthermore, the exclusion model indicates that open housing will not be a financial disaster for landlords, and that it will not completely eliminate the black-white rent differential in neighborhoods undergoing racial change. Finally, clearinghouses for apartment information, which significantly lower landlords' incentives to discriminate, will increase the effectiveness of open housing legislation.

NOTES

[1]For a thoughtful discussion of these two terms, see Simpson and Yinger, 1972, ch. 1.

[2]For example, seven important types of discrimination are defined by Thurow (1969, pp. 117-118).

[3]The data on renters in SMSAs are found in a census report (U.S. Bureau of the Census, 1970, p. 280). One brief discussion without documentation of the small size of, among other things, real estate management firms, can be found in the Kaiser Committee Report, excerpted in Edel and Rothenberg, 1972, pp. 178-193. See especially p. 187.

[4]For some recent estimates of the degree of racial residential segregation in American cities, see Sørensen, Taeuber, and Hollingsworth, 1974.

[5]If the Puerto Rican population is included, 89.1 percent of the buildings in Sternlieb's sample were completely segregated, 10.4 percent were integrated, and .5 percent were vacant. See Sternlieb, 1969, p. 63, Exhibit 3-1.

[6]References to real estate agents have been deleted from this and all of the following quotations from Muth.

[7]Actually, a weaker assumption is possible here. If the rental whites are willing to pay is positive for all racial compositions, then the Kuhn-Tucker conditions for problem (4) can be used to prove that vacancies are never profitable.

[8]These surveys are reviewed in Pettigrew, 1973. Note that the desire to live in an integrated neighborhood reflects many different attitudes, including racial prejudice and the desire for high-quality local public services. Thus, a preference by blacks for integrated neighborhoods could exist despite strong black prejudice against whites. In this paper, we will make no attempt to separate the effects of these various attitudes.

[9]A minor technical point arises in the case of hill-shaped black demand curves: it is possible to have a local optimum at an interior point (that is, with $0 < Q_b < Q$) if the black marginal revenue curve intersects the white marginal revenue curve from above at some high value of Q_b. However, such a point will not be preferable to an all-white solution unless the white demand curve is very flat and the black demand curve is very curved--neither of which appears to be likely.

[10] Remember that the analysis of case 1B also applies to the desire for an integrated neighborhood on the part of blacks. See page 23. Case 1B is illustrated in Figure 3.

[11] For one general treatment of market failure in the case of imperfect information, see Arrow, 1971.

[12] Apparently with this argument in mind, the National Committee Against Discrimination in Housing has also advocated the use of centralized listing services for information on apartments. See NCDH, 1970, p. 43, Recommendations 5 and 9.

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